

**UTAH DIVISION OF AIR QUALITY
MODIFIED SOURCE PLAN REVIEW**

George W. Cross, President
Intermountain Power Service Corporation
850 West Brush Wellman Rd
Delta, Utah 84624

N0327-011

RE: Experimental AO to Test
Millard County, Utah CDS-A, ATT, Title V, NSPS

REVIEW ENGINEER: Nando Meli Jr.

DATE: February 6, 2003
NOTICE OF INTENT DATED: January 30, 2003

PLANT CONTACT: Rand Crafts
PHONE NUMBERS: (435) 864-6494
FAX NUMBER: (435) 864-0994
Dennis Killian
(435) 864-4414.

PLANT LOCATION: 850 West Brush Wellman Road Delta, Millard County, Utah

UTM COORDINATES: 4,374.4 km Northing, 364.2 km Easting, Zone 12
datum NAD27

APPROVALS:

Peer Engineer


Rusty Ruby

DAQ requests that a company/corporation official read the attached draft/proposed Approval Order conditions. If this person does not understand or does not agree with the conditions, the PLAN REVIEW ENGINEER - TECHNICIAN should be contacted within five days after receipt of the conditions. If this person understands and the company/corporation agrees with the Approval Order conditions, this person should sign below and return (can use FAX # 801-536-4099) within 10 days after receipt of the conditions. Thank You.

Applicant Contact Made



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Correction

UTAH DIVISION OF AIR QUALITY MODIFIED SOURCE PLAN REVIEW

S. Dale Chapman, President
Intermountain Power Service Corporation
850 West Brush Wellman Rd
Delta, Utah 84624

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Peer Engineer *Rusty Ruby*
Rusty Ruby

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1. DESCRIPTION OF PROPOSAL

Intermountain Power Service Corporation (IPSC) has requested an experimental Approval Order to demonstrate and collect data on an overfire air (OFA) system at the Intermountain Generating Station (IGS) in Delta, Utah. The IGS is a coal-fired steam-electric generating plant located in Millard County.

IPSC has proposed to install a multi-port overfire air system to control NO_x generation from coal combustion. The overfire air system will redirect approximately 10-15 percent of total combustion air to a staged system of ports located directly above the top row of burners.

IPSC submitted an NOI on September 23, 2002 requesting approval to install and operate an OFA system. Due to the lack of supporting data required to modify their Approval Order and Title V permit they have requested approval to install and test an OFA on an experimental basis. Testing will be performed to demonstrate the effectiveness of overfire in NO_x control, as well as data collection that can be used to make a final determination in approval of the continuous operation of the OFA system.

Description of the OFA System and Control Devices

Babcock Power, Inc. (BPI) is providing the OFA system at the Intermountain Generating Station (IGS). It consists of two rows of OFA ports located immediately above the top burner levels on both the front and rear sides of the boiler.

Air to the OFA system is provided by the Secondary Air (SA) system. A feeder duct extends from each SA header duct to the corresponding OFA header through which secondary air is admitted to the OFA headers. Each OFA feeder duct includes isolation dampers operated by Jordan rotary electrical drives. OFA airflow to the boiler is admitted and controlled through the OFA port dampers. Each OFA port is partitioned into separate 1/3 and 2/3 sections. Port dampers located in each partition control airflow through each partition. The four, 1/3 port dampers for an OFA row half are connected or ganged together for simultaneous operation by a Jordan rotary electrical drive. The same configuration is implemented for the 2/3 port damper sets. This creates a total of four, 1/3 port dampers/drives and four, 2/3 port dampers/drives for air flow control to the boiler.

Control and monitoring of all OFA damper drives will be done by the IGS combustion control system. Additionally, an array of three Air Monitor Corporation VOLU-probes and thermocouples will measure OFA mass flow through each of the feeder ducts.

Description of the Proposed Control Strategy

All boiler load set point values and the OFA secondary air ratio, described below, are initial values. These values will be revised based on the results of the commissioning performance tests.

OFA is most effective controlling NO_x formation at unit loads above 60% of the rated load of 950 MW. When utilized at the 60% load point and above, OFA flow will be accomplished by the combination of opening OFA feeder and port dampers and decreasing the combustion air damper positions, so as to maintain target total SA flow based on unit load.

The OFA port and feeder duct dampers are not modulating and will be operated either fully open or fully closed. This SA damper control is additive to the existing bias required to change burner airflow in proportion to the individual pulverizer load. The action of the sum of both biases will result in less secondary air directly to the burners, as OFA is being introduced, but the relative secondary air distribution between burner elevations will remain unchanged. The initial program is as follows:

| | |
|-------------------------|----------------------------------|
| 0 to 60% boiler load: | All 1/3 and 2/3 ports closed |
| 60 to 75% boiler load: | 1/3 ports open, 2/3 ports closed |
| 75 to 90% boiler load: | 1/3 ports closed, 2/3 ports open |
| 90 to 100% boiler load: | 1/3 ports open, 2/3 ports open |

An individual manual/automatic and bias station per port group damper drive will be provided by IPSC.

Target Operating Parameters for OFA Design

The OFA modifications shall provide for a continuous boiler rating of 6,900,000 lbs/hr steam output under normal operating conditions. Of particular interest to IPSC are the performance parameters associated with operation at 950 Megawatts gross generation (6.75 MMlbs/hr steam flow). These include:

- a. Total NO_x output of 0.40 lbs/MMBTU or less and an overall reduction of 15%. Current maximum average of 0.45 lbs/MMBTU.
- b. Superheat and reheat temperatures as well as NO_x emissions must remain within the contract stated acceptable ranges throughout the test.
- c. Impact on average unburned carbon (LOIs) and carbon monoxide (CO) concentrations within the boiler.
- d. The above operational parameters shall be verified in a steady state operational test within 30 days of installation. Steady state operation shall be defined as stable and reliable operation at and within the following operating conditions and ranges for a period of at least 7 days:
 - 7 pulverizers in service (E and G Pulverizers alternately out-of-service).
 - Excess air to be controlled between 2.5 to 3.2%.
 - Superheat and convection surfaces maintained at 80-85% cleanliness
 - Boiler tube maximum allowable metal temperatures must not be exceeded.
 - Turbine throttle pressure of 2375 psi.
 - Furnace cleanliness maintained at 85-90% actual cleanliness.
 - Superheat attemperator spray flow at or above 50,000lbs steam/hr
 - Reheat attemperator spray flow at 0 lbs steam/hr

These are target parameters only for purposes of OFA design and performance evaluation.

Good Combustion Practice

Since fuel utilization and combustion efficiency suffer in attempts to minimize NO_x generation in the boiler, CO can rise due to incomplete or poor combustion. There are no add-on controls specific to CO technologically, nor are they commercially available in any form for utility steam generators. As a matter of practice, BACT for CO is considered to be Good Combustion Practice.

II. RECOMMENDED EXPERIMENTAL APPROVAL ORDER.

S. Gale Chapman, President
Intermountain Power Service Corporation
850 West Brush Wellman Rd
Delta, Utah 84624

Dear Mr. Chapman:

RE: EXPERIMENTAL APPROVAL ORDER TO TEST OVERFIRE AIR SYSTEM FOR NO_x CONTROL, MILLARD COUNTY, CDS-A, ATT, NSPS TITLE V
Project Code: N0327-011

The IPSC initial request, dated January 30, 2003 for approval of the overfire air (OFA) system on the Unit 1 boiler at the Intermountain Generating Station (IGS) was received by the Utah Division of Air Quality (DAQ) on January 30, 2003. The request for an Experimental Approval Order (AO) was so that Intermountain Power Service Corporation (IPSC) could conduct research at the IGS on using OFA to control NO_x generation from coal combustion and acquire the data needed to modify the current IGS Approval Order and Title V permit.

Abstract Intermountain Power Service Corporation (IPSC) has requested an experimental Approval Order to demonstrate and collect data on an overfire air (OFA) system at the Intermountain Generating Station (IGS) in Delta, Utah. The IGS is a coal-fired steam-electric generating plant located in Millard County. IPSC has proposed to install a multi-port OFA air system on Unit 1 to control NO_x generation from coal combustion. Testing will be performed to demonstrate the effectiveness of overfire in NO_x control, as well as data collection that can be used to make a final determination by DAQ in approving the continuous operation of the OFA system. Millard County is an attainment area of the National Ambient Air Quality Standards (NAAQS) for all pollutants. New Source Performance Standards (NSPS), Subpart Da and Subpart Y apply to this source. Boiler Units 1 & 2 are also Group 1, Phase II units under the Acid Rain Program. IPSC is a major source of NO_x, SO₂, CO, and PM₁₀. Title V of the 1990 Clean Air Act applies to this source.

The Notice of Intent (NOI) for the above-referenced project has been evaluated and has been found to be consistent with the requirements of the Utah Administrative Code (UAC). However, air pollution producing sources and/or their air control facilities may not be constructed, installed, established, or modified prior to the issuance of an Experimental AO by the Executive Secretary of the Utah Air Quality Board.

Approval for trial test operation of the overfire air system is hereby granted in accordance with Section 19-2-107 (2)(c) of the Utah Air Conservation Act under the following conditions:

1. The test operation of the overfire air (OFA) system shall only be performed in the Intermountain Generating Station located in Delta, Utah.
2. During the test period the OFA shall only be operated on the Unit 1 boiler.

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3. The trial test operations of the OFA shall not be performed more than 150 days from the date of this Experimental Approval Order (AO).
4. All requirements of the AO DAQE-049-02, dated January 11, 2002, and the Title V permit 2700010001 shall be adhered to. This Experimental AO does not give approval to violate any conditions in the AO or the Title V permit.
5. The test operation of the OFA system shall be terminated if the emissions and/or opacity limits listed in the AO DAQE-049-02 for the Unit 1 boiler are exceeded.

A report describing the results of the test operations of the overfire air system shall be submitted to the Executive Secretary, Utah Air Quality Board, attention New Source Review Section, within 45 days after the project is completed. The report, at a minimum, shall include the emissions measured, the positions of all dampers when the emissions are measured, mass airflow and all other measurements taken that are affected by the OFA system.

The Division of Air Quality does not endorse the products, chemicals or equipment used in this Experimental AO.

The Division of Air Quality is authorized to charge a fee for reimbursement of the actual costs incurred in the issuance of an AO. An invoice will follow upon issuance of this Experimental AO.

If you have any questions on the Experimental Approval conditions, please contact Nando Meli at (801) 536-4052.

Sincerely,

Richard W. Sprout Executive Secretary
Utah Air Quality Board

RWS:NM:

cc: Millard County District Health Department